

# SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL



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## FINAL REPORT COOPERATIVE AGREEMENT (NA04NMF4410347) OCTOBER 1, 2004 – DECEMBER 31, 2006

During the period October 1, 2004 through December 31, 2006 the South Atlantic Fishery Management Council (SAFMC) worked to ensure the mandates of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) are met relative to the conservation and management of the South Atlantic coral and coral reef resources. Below are summaries of accomplishments by project under this award.

### ***Project: NOAA CRG 2004 Support and Maintenance for serving Maps of Coral and Live/Hardbottom EFH and EFH-HAPCs via the Internet***

Under this award, the Fish and Wildlife Research Institute (FWRI) continued working with the South Atlantic Fishery Management Council (SAFMC) to enhance the Coral and Benthic Habitats Internet Map Server (IMS) (renamed "Habitat and Ecosystem IMS") and a SAFMC Comprehensive Habitat and Fishery Ecosystem Plan Website. Throughout the duration of this project, the website and IMS application have continued to improve as new data sets and functionality are integrated. The products developed through this project are directly assisting the Council to manage and conserve coral and other fishery resources, and the habitats they depend upon, in the South Atlantic region.

### **IMS Integration**

The map configuration file was coded to incorporate new GIS data layer (see below). Scale dependencies were defined and tuned to speed draw times for imagery or large data layers. The IMS application was also programmed to include a customized toolbar and frames. Text buttons for the toolbar were designed to provide a more intuitive interface for non-GIS users. Links to the SAFMC site and FWRI site were added to the IMS banner. To avoid a long list of data layers displayed in the legend of the viewer, the site was further customized to group data layers categorically and/or geographically. This coding permits the combining of layers into groups, which may be collapsed and expanded by the user. The code also distinguishes between layers that are visible and layers that have been flagged as visible but cannot be viewed at the current zoom level.

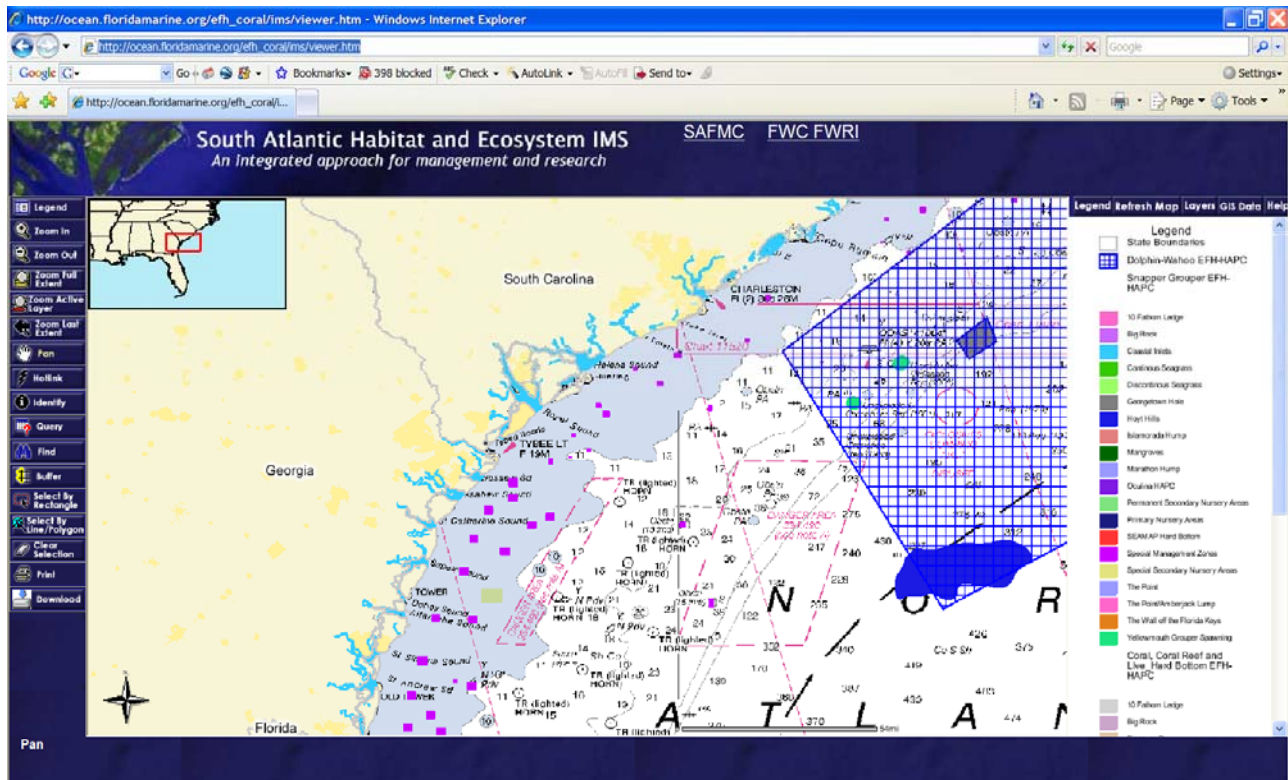
### **GIS Data**

Under this award the FWRI collaborated with the SAFMC to identify, prioritize and obtain data sets for enhancing the IMS application. Standard tiled Digital Elevation Models (DEM) 30-m grid bathymetry for available estuaries in the South Atlantic Bight was processed for inclusion. The Special Projects Office of the National Ocean Service generated these products. Data layers that were added to the IMS under this award include the following:

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- SAFMC Special Management Zones
- Georgia and South Carolina Artificial Reefs
- Updated Florida Artificial Reefs
- Proposed MPAs
- Gray's Reef benthic habitats and high resolution bathymetry
- North Carolina CCAP
- Transportation layers for NC, SC and GA
- North Carolina Artificial Reefs
- Additional Nautical Charts
- Improved Oculina HAPC boundaries
- National Data Buoy Center (with hyperlinks)
- Florida habitat layers (seagrasses, mangroves, tidal flats, and salt marsh)
- Florida marine facilities
- Popenoe/Skidaway geological maps for bottom types and coral mounds
- Right Whale critical habitat
- FKNMS panoramic coral videos (with hyperlinks)
- MARMAP species data
- SEAMAP coded grid cells
- State waters polygon
- Continental Shelf
- Proposed deepwater coral HAPCs
- Dolphin Wahoo EFH-HAPCs
- National Benthic Inventory (with hyperlinks)

A screen shot of the IMS application is provided in **Figure 1**.



**Figure 1.** Example of the HTML viewer developed for the South Atlantic Habitat and Ecosystem IMS (formerly Coral and Benthic Habitats IMS). To visit the application, go to: [http://ocean.floridamarine.org/efh\\_coral/ims/viewer.htm](http://ocean.floridamarine.org/efh_coral/ims/viewer.htm)

### **Web pages**

A prototype site titled “SAFMC Comprehensive Habitat and Fishery Ecosystem Plan” was produced after initial discussions among SAFMC and FWRI staff. The layout of the original site incorporated the major components (as individual pages) of the developing Fishery Ecosystem Plan such as Ecosystem Boundaries, Food Webs, EFH and Life History, Ecosystem Health, Research and Monitoring, and Management. There were also pages dedicated to deepwater corals

<http://www.safmc.net/ecosystem/HabitatManagement/DeepwaterCorals/LopheliaCommunities/tabid/247/Default.aspx>, <http://www.safmc.net/ecosystem/HabitatManagement/DeepwaterCorals/OculinaBank/tabid/246/Default.aspx>, fishery management plans, GIS data (entry point to the IMS application), and key issues in the South Atlantic region like Coral and Sargassum. The web site has grown considerably since its initial development through CRCP 2004 funding. Currently, it has been incorporated into the larger SAFMC website, although retaining a separate identity. To view the pages that have grown from this initial effort, visit: <http://www.safmc.net/Home/EcosystemHome/tabid/435/Default.aspx>

### **Document Conversion**

An important component of the web site was to integrate gray or white literature pertaining to coral or EFH projects in the South Atlantic region as well as available SAFMC documents. FWRI utilized a high-speed scanner to scan render a variety of historic and recent documents to electronic format. Using a high-speed scanner, the hard copy documents were scanned to Tiff files then were converted to a PDF format. After the document was scanned, the resultant pdf file's pagination was double-checked to ensure all pages of the original document were included. Unfortunately, some of the documents were cumbersome to prepare for scanning due to binding types. Also, older type-written documents proved unsuitable for scanning. Example documents include: Comprehensive Amendment Addressing the Sustainable Fisheries Act, Amendment 2 to the FMP for Coral and Coral Reefs of the Gulf and South Atlantic, FMP for the Snapper Grouper Fishery of the South Atlantic, Developmental Patterns within a Multispecies Reef Fishery: Management Applications for Essential Fish Habitats and Protected Areas, Golden Crab FMP, and Spiny Lobster FMP.

### **Purchase updated development server to augment SAFMC projects**

There are several considerations to make when purchasing hardware for ArcIMS applications. Although the processor, CPU speed, and RAM specification of the machine are considered the most important. ESRI recommends a CPU speed of 1.0 GHz or higher and Intel Pentium or Intel Xeon Processors. After thoroughly reviewing the current systems available and considering the upcoming ESRI licensing structure changes, FWRI opted for a Dell PowerEdge with Dual Core Xeon Processors. This machine also provides a 4MB Cache, 3.00GHz 1333MHz and 16GB of memory. The updated development server for SAFMC web applications was purchased in December 2006.

### **Maintenance and Development of the Habitat and Ecosystem Website**

The existing South Atlantic Fishery Management Council Habitat/Ecosystem site is hosted on a server maintained by MapWise, Inc. FWRI sub-contracted to MapWise for web development and technical support to continue building the SAFMC Habitat/Ecosystem site.

The following key tasks were completed under this sub-contract:

- Web design
- Web coding (HTML, JavaScript, and CSS)
- Workflow / processes support

Web development, design and support were provided over the course of this project's duration.

### **Harbor Branch Oceanographic Institution (HBOI) Deepwater Coral Report Update**

John Reed with the Harbor Branch Oceanographic Institution updated the 2004 Deepwater Coral Report to SAFMC an assessment of known deep water coral areas in the South Atlantic (Attached. See summary for next project below). This revised one of two reports provided to the Council by J. Reed (Harbor Branch Oceanographic Institution) and Dr. S. Ross (UNCW). These reports are the foundation for the deepwater coral section of the developing Fishery Ecosystem Plan and have been used to help guide the proposed designation of new deepwater coral Habitat Areas of Particular Concern as well as research and monitoring priorities in the developing Deepwater Coral Research and Monitoring Plan. The updated report and accompanying DVD were submitted to the Council in August 2006.

### **Incorporate Southeastern U.S. Deep-Sea Corals Initiative (SEADESC) products**

FWRI coordinated with UNCW and Friends of the North Carolina State Museum to incorporate selected SEADESC products on the Habitat and Ecosystem Homepage and IMS. UNCW staff provided FWRI materials to highlight SEADESC's accomplishments to date. This material included SEADESC overview text, completed dive characterization forms, shapefiles for processed dive-tracks with habitat classifications, hyperlinked video clips or images, and associated metadata records. This task was completed in August 2006.

### **Development of Map Wizard Tool**

A customized map wizard tool continued to be developed for this project to add value in the areas of query and spatial operations. As of December 2006, FWRI had posted the application and began conducting an internal review of the functionality and performance. The review process is still ongoing under the subsequent 2005 CRCP award.

***Project: NOAA CRG 2004 Continue Partnership with NURC/UNCW and the States in the documentation and multi-beam mapping of the Outer Continental Shelf and Upper Continental Slope deepwater habitat and coral reef systems.***

#### ***Task 1. Continued Support for Multi-beam mapping***

This project extended the Council's partnership with NURC/UNCW by providing additional funds to enhance the capabilities of the NURC Autonomous Underwater Vehicle (AUV) through the acquisition of an integrated digital camera and strobe. However, NURC/UNCW opted to delay the procurement of the camera pending a re-evaluation of the industry and of the NAUV's capabilities. Consequently a no-cost extension (through December 2006) and reprogramming of unexpended funds request was submitted to NOAA grants in February 2006 and subsequently approved. Funds were transferred to FWRI to accomplish some of the tasks described above.

**Task 2. Summarization of existing data on *Lophelia pertusa* reefs in the South Atlantic Bight.**

NURC/UNCW worked with Dr. S. Ross and J. Reed to review available data and sources of information to establish distribution of *Lophelia pertusa* in the South Atlantic region. Dr. Ross and Mr. Reed have archived data from numerous research activities in the region including submersible dives on the shelf edge and upper slope off Georgia and east Florida. Many of these dives were targeted at high relief reefs and deep coral ecosystems. Dr. Ross has participated in shelf edge and upper slope research off the Carolinas since the 1980s, in collaboration with NOAA and USGS. For this task each PI selected representative deep coral sites and provided dive log information, general description of the reefs, species list(s) and selected imagery (still shots and video clips). GIS shapefiles that were created as part of this effort have been incorporated into the Council's IMS and video clips can be viewed at <http://www.safmc.net/ecosystem/HabitatManagement/DeepwaterCorals/LopheliaCommunities/tabid/247/Default.aspx>. This effort was critical in consolidating the most up-to-date information on distribution and preliminary characterization of these deepwater coral habitats.

Two comprehensive reports (attached) resulted from his effort: Reed, J. 2004. *Deep-water Coral Reefs of Florida, Georgia and South Carolina: A Summary of the Distribution, Habitat, and Associated Fauna* and Ross, S. 2004. *General Description of Distribution, Habitat, and Associated Fauna of Deep Water Coral Reefs on the North Carolina Continental Slope*. The PIs presented the information contained in these reports to the Council's Coral and Habitat Advisory Panels at their joint meeting in October 2004 in Charleston, SC. The Advisory Panels responded with a recommendation to designate 6 areas as deepwater coral HAPCs. The Council subsequently approved the APs proposal at their December 2004 meeting. In June 2006, the APs again received presentations on the latest research into the distribution and uniqueness of these deepwater ecosystems. (see summary for previous project). The original 6 proposed HAPCs were subsequently consolidated into 4. HAPC designation for these 4 areas will take place in 2008 under the Council's Comprehensive Fishery Ecosystem Plan Amendment currently under development.

***Project: NOAA CRG 2004 Continuation- Field Verification and Compilation of Photography and Video of a Representative Sample of Near-shore Coral Live/Hard Bottom Habitat Designated as EFH.***

Planning was initiated for Council staff to work with state scientists and through contracts with other agencies, institutions, and/or individuals to begin field verifying and compiling video and photography of a representative sample of near-shore coral live/hard bottom habitat designated as EFH, EFH-HAPCs and other coral areas as presented in the SEAMAP Bottom Mapping Project. An ArcGIS ArcPad System was purchased to verify location and an underwater camera and video camera were obtained to compile visual representations of resources managed under the Coral Fishery Management Plan.

Due to logistical issues in scheduling vessel time through state agencies, no further activity took place. However, due to active cruise scheduling in the region, it is anticipated that opportunities will arise in the future to accomplish this task.

***Project: NOAA CRG 2004 Maintenance of Council GIS Capabilities.***

Additional hardware was purchased to support the Council GIS System and expand presentation and field GIS capabilities. Additional training of staff responsible for building the geodatabase and use of analytical software was accomplished during this period. The new hardware and upgraded software are essential in the ongoing transformation of existing EFH, EFH-HAPC and other coral related information into compatible GIS products. In addition, a number of new data sets and GIS products for deepwater coral habitat are being developed and the updated capabilities are facilitating their integration into the Council GIS system. GIS system operational costs include software maintenance fees to ensure updated versions are readily available. Training and maintaining updated software has been especially important in the continued effort to identify, describe, map, and protect coral and live bottom Essential Fish Habitat and support the development of deepwater MPAs and Coral HAPCs.

***Project: NOAA CRG 2004 Support Fisheries Scientist to provide Additional Technical Support for Council Coral Conservation and Management Activities.***

The Coral Fishery Scientist has provided direct support to the Council in the review of existing and development of new coral, habitat and ecosystem information for the evolving Fishery Ecosystem Plan (FEP) for the region. She continued to coordinate directly with regional scientists and resource managers participating in the development of the FEP document. The Fishery Scientist has also provided support and coordination for the development of a Deepwater Coral Research and Monitoring Plan for the South Atlantic region. The Fishery Scientist continued to assist in the maintenance and enhancement of the Council's Habitat and Ecosystem website in coordination with FWRI personnel.

The coral fisheries scientist has successfully performed the duties and responsibilities below:

1. Assisted in the formulation and development of the coral, habitat and other associated sections of the developing Fishery ecosystem Plan and other FMP documents.
2. Provided technical review/revision of FMPs, amendments and regulations before they were submitted to the Secretary for review and approval.
3. Acquired, compiled and reviewed technical data needed to meet the Council's mandates relative to Essential Fish Habitat and Habitat Areas of Particular Concern.
4. Provided comments on non-fishing activities with potential impacts to EFH and EFH-HAPCs.
5. Assisted in the development of web resources for coral and associated benthic habitat maintained and updated the Habitat and Ecosystem pages of the Council's website.
6. Planned, developed and prepared proposals to request programmatic funding in support of Council's coral and habitat related activities.
7. Served as Contract Monitor coordinating and monitoring Council contracts with government agencies, universities and others.
8. Prepared progress and final reports for the Council's awards pertaining to coral.

Prepared by:

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Executive Director

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Date

